Dr. J. Westmann (8) briefly discusses the shrinkage of a snow cover at several points on the public square in Upsala, separated from each other by short distance. He selected a place where the snow cover was fairly uniform and had a depth of approximately 20 cm. (7.8 inches). Ten measurements were made at points distant from each other about 3 meters (9.8 feet) and the mean of these 10 measurements was adopted as the mean depth for the time and place. Continuing these measurements over a period of 12 days in March, 1901, during which time thawing weather did not prevail, he was able to accurately note the diminution of the snow cover day by day. Another series of measurements was made in snow that had been shoveled together in which the total depth was at one time 54 cm. (21.2 inches). The average temperature during the period was 31.1 °F. The diminution in depth of the snow cover was greatest in the snow that had been piled together artificially, the maximum decrease recorded in 24 hours being 4.8 cm. (1.9 inches). Where the snow lay as it fell, the maximum decrease recorded in 24 hours was 3.93 cm. (1.53) the average daily decrease being 1.28 cm. (0.5 inch).

Dr. Westmann considers the loss due to evaporation as being of small importance and points out that in some cases the gain by condensation more than balances the loss by evaporation.

The water content of the snow was determined by weighing a known volume taken from the same points at which depth measurements were made. Two series of density determinations were made, the first for a top layer of 12 cm. (4.7 inches) and the other for a layer of 6 cm. (2.4 inches) next to the earth's surface. The results show, as was to be expected, that the density increases with the depth.

Dr. Westmann also points out that the water equivalent of the snow cover, which was 70 mm. on March 10, had diminished to 30 mm. on March 23. He considers the loss of 40 mm. to have been due to melting snow, the greater portion of which flowed away. During the melting the structure of the snow changes essentially, the ordinary snow becomes changed into angular grains, when the adhesion between these grains becomes small through intense melting, the structure of the snow becomes as coarse sand.

The same author in collaboration with M. Jansson discusses at length and in great detail the several influences contributing to a diminution in depth of a snow layer. (See p. 105.)

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GROWTH, SETTLING, AND FINAL DISAPPEARANCE OF A SNOW COVER IN THE SIERRA NEVADA, 1915–16.

By HENRY F. ALCIATORE, Meteorologist.

[Dated: Weather Bureau, Reno, Nev.—,1917.]

The following is a brief account of the controlling factors which determined the growth, settling, melting, and final disappearance of the snow cover of the 1915–16 season at four typical Weather Bureau mountain snowfall stations in the Lake Tahoe watershed. The stations selected were: Tahoe and Tallac, Cal., on the west side, and Marlette Lake, Nev., and Bijou, Cal., on the east side of the lake. All of these, except Marlette Lake, are on the shores of Lake Tahoe. Marlette Lake is a small body of water about 1,700 feet above the surface of Lake Tahoe, 2 miles east of the latter.

The season opened with a general snowstorm, November 8, 1915. November, January, and May were colder than usual, but February, March, and April were quite mild, particularly February. If in the absence of humidity, wind, and sunshine data for the places named, we consult the records of the nearest Weather Bureau observatory, namely, those of Reno, Nev., we find that from March to June the weather was unusually dry and windy and the amount of insolation considerably above the normal for the season, yet, in spite of these conditions, the snow cover finally disappeared at about the usual time of year at Marlette Lake, and somewhat ahead of time at the other stations.

Speaking generally, if we exclude impurities, a snow cover consists of two elements, and only two, i. e., snow and air. As a rule, fresh snow contains more air than snow, and the reverse of this holds true for the lower layers of a snow cover. For example, at one point in the Carson watershed, the snow was 10 feet deep, and its average density was 40 per cent; hence a cylinder of that snow, of one square foot base, would have contained about 6 cubic feet of air, and only 4 cubic feet of snow.

The details of the topography, geographical location, etc., of each station whose records have been used in this paper will be found in Table 11. The first three are on the lake shore, while the fourth, Marlette Lake, is 1,670 feet above the lake surface, and about 2 miles inland, on the eastern part of the drainage basin of the lake.

TABLE 11.—*Location of mountain snowfall stations.*

	Altitude.	Latitude. (N.)	Longitude. (W.)
	Feet.	° ′	° ′
Tahoe, Cal	6,230	39 9	120 12
Tallac, Cal	6,230	38 56	120 2
Bijou, Cal	6,230	38 57	119 58
Marlette Lake, Nev	7,900	39 10	119 55

As pointed out by Prof. Henry for the high Sierras of central California (27), so in the Tahoe Basin the fact that a considerable portion of the snow on the ground in midwinter settled or packed through natural causes aside from the occurrence of warm weather attended by rain is evident. In fact, the greatest amount of fortnightly settling at any station, namely, at the rate of 7.2 inches per day (Marlette Lake) occurred in January, the coldest month of the season, and one of the coldest on record. The average daily settling of the snow cover for the entire season, in inches, was 2.2 inches at Tahoe, 1.6 at Tallac, 1.5 at Bijou, and 1.7 at Marlette Lake. Comparing these values with the corresponding ones given by Henry for Fordyce Dam, Summit, and Tamarack, Cal., for a period of years, which were 1.9, 2, and 2 inches, respectively, we note that Tahoe, Cal., at an altitude of 6,230 feet, shows a slightly greater rate (in 1915–16) than the average rate given for Tamarack. The most pronounced settling occurred at all stations in the Tahoe Basin in January, the month of heaviest snow; at Tallac, in February, a month of scant snowfall.

Table 11 below has been prepared to show the daily changes in depth of snow cover at a single station in the Tahoe Basin for the period November 9 to December 31, 1915. The amount of snow, as it fell day by day, has been entered in the second column and the total depth of the snow cover on the ground is given in the third column each day. It will be readily seen that the depth on the ground diminishes quite steadily and irregularly. Thus, on November 9, a total cover of 31 inches of freshly fallen snow was on the ground. That amount diminished until, on the 22d, there were but 3 inches remaining. Further details become apparent by an inspection of Table 12.

TABLE 12.—*Daily depths of the snow cover at a single station in the Lake Tahoe Basin, November–December, 1915.*

Date.	Snow. Depth of fall.	Snow. Amount on ground.	Daily change.
1915.	*Inches.*	*Inches.*	*Inches.*
Nov. 8	2.0	0	
9	29.0	31.0	
10		24.0	− 7
11		18.0	− 6
12		15.0	− 3
13		14.0	− 1
14		13.0	− 1
15		11.0	− 2
16	2.0	9.0	− 2
17		8.0	− 1
18		7.0	− 1
19		6.0	− 1
20		4.5	− 1.5
21		4.0	− 0.5
22		3.0	− 1
23	3.5	6.5	+ 3.5
24		6.5	0
25		6.0	− 0.5
26		6.0	0
27		5.5	− 0.5
28		5.5	0
29		5.0	− 0.5
30		3.0	− 2.0
Dec. 1		3.0	0
2		2.0	− 1
3	10.0	12.0	+10
4		11.0	− 1
5		8.0	− 3
Dec. 6		7.0	− 1
7		6.0	− 1
8		5.0	− 1
9		4.5	− 1.5
10		3.0	− 1.5
11	1.0	4.0	+ 1
12		3.0	− 1
13	9.0	12.0	+ 9
14	20.0	32.0	+20
15		29.0	− 3
16		24.0	− 5
17		22.0	− 2
18		19.0	− 3
19		19.0	0
20		18.0	− 1
21		18.0	0
22		17.0	− 1
23		16.0	− 1
24		15.0	− 1
25	1.0	16.0	+ 1
26		16.0	0
27		15.0	− 1
28		15.0	0
29	1.0	16.0	+ 1
30		16.0	0
31		16.0	0
Total	78.5		

The mean monthly temperature, the departure from the normal, together with the amount of settling and melting, and percentage decrease of snow cover for stations for which records are available, are given by months in Table 13.

The figures in the next to last column were obtained by adding to the depth of snow on the ground on the first day of the month the total snowfall during the month and subtracting from the sum thus obtained the amount of snow which remained on the ground at the end of the month. For example: Tahoe City, Cal., December 1915, total fall during month=42 inches; on ground, first of month=3 inches; total=45 inches; on ground at end of month=16 inches, therefore amount of settling or disappearance during the month=29 inches (See Table 12).

The values in the last column of Table 13 illustrate the difference between losses of snow by settling and by melting. For example, in January the losses by settling were:

51 per cent at Tahoe.
41 per cent at Tallac.
47 per cent at Bijou.
55 per cent at Marlette Lake.

In April the losses by melting (actual disappearance) were:

97 per cent at Tahoe.
100 per cent at Tallac.
100 per cent at Bijou.
36 per cent at Marlette Lake.

TABLE 13.—*Mean temperature and departure from normal, and loss of snow by settling and melting.*

Months.	Mean temperature.	Departure from normal.	Amount of settling and melting.	Loss by settling and melting.
Tahoe, Cal.				
	°*F.*	°*F.*	*Inches.*	*Per cent.*
November	35.7	−1.3	33	92
December	29.4	−1.4	29	65
January	22.5	−4.5	129	51
February	34.6	−6.6	72	49
March	35.4	−2.4	56	58
April	40.0	−3.0	56	97
Tallac, Cal.				
November	39.6	−0.6	1	100
December	31.0	−2.0	26	79
January	23.6	−6.4	66	41
February	31.6	−0.6	86	74
March	38.6	−1.6	38	56
April 1–17	44.2	−3.2	30	100
Bijou, Cal.				
November	40.8	−1.2	9	100
December	32.2	−1.2	17	59
January	25.6	−4.4	67	47
February	33.4	−4.4	57	56
March	39.8	−4.8	45	70
April 1–20	45.0	−6.0	19	100
Marlette Lake, Nev.				
November			16	76
December			42	58
January			125	55
February			63	45
March			27	26
April			28	36
May			44	79
June 1–6			12	100

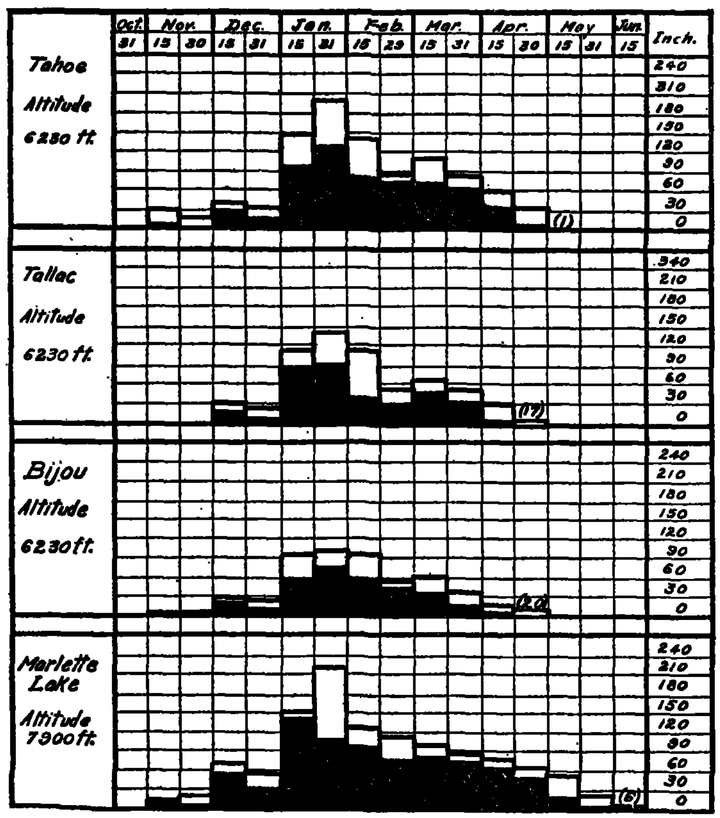

FIG. 2.—Diagrams of growth, settling, and disappearance of the snow cover over the Lake Tahoe Basin, 1915-16.
Shaded areas show depth; unshaded areas within heavy line show amount of settling or melting. Small figures in ( ) give date of disappearance of last snow.

The records of three stations covering the snowfall conditions of the last three seasons have been examined, to ascertain whether the thickness of the snow cover at time of its maximum depth for the season and the time of final disappearance were related; as to Tahoe and Bijou, the results were negative; at the high-level station, however, such a relationship was observed, as may be gathered from Table 14.

TABLE 14.—*Showing relation of depth of maximum snow to date of final disappearance at Marlette Lake.*

Year.	Date of maximum depth of cover.	Depth.	Date of final disappearance.
		Inches.	
1914	Jan. 24	158	June 9
1916	Jan. 18	141	June 6
1915	Feb. 11	84	June 3

Referring to figure 2 we note that the settling of the snow was more gradual at Marlette Lake than at the shore stations; also that on May 31 at the close of the season the depth of snow on the ground at that place was normal, i. e., 12 inches.

DENSITY OF SNOW COVER AT BUMPING LAKE, WASH.

Table 15 presents a series of weekly measurements of the density of the snow cover at Bumping Lake, Wash., together with a record of the temperature and precipitation during the time the density measurements were made. The measurements were made by Mr. J. H. Nelson, of the U. S. Reclamation Service.

This table is of special interest since it enables one to note the march of snow density with the season and to observe the apparent effect of the changing weather conditions on the water content of the snow cover. The weekly depths and densities of the snow cover, as given in the table, are the means of 10 separate measurements.

Columns 2 and 3 of Table 15 refer to the snow layer at the time stated in the first column. Columns 4, 5, 6, 7, 8 and 9 refer to the current weather conditions of the week. The data in column 10 total possible water available, is obtained as follows: For example ending November 16, 1914, the average depth of the snow layer was 17.5 inches and the density of the layer was 0.151 therefore $17.5 \times 0.151 = 2.54$ inches, the water content of the snow. To this amount is added the total precipitation as snow during the week as entered in column 5, viz, 2.52 inches, making the water available had none been lost, 5.16 inches. Column 11 is simply the gain or loss week by week as shown by the entries in column 10.

Considering these weekly values of available water, it is noted, as might easily by inferred, that there is a continual oscillation up and down. The apparent lack of control exerted by the weather conditions on the water content of the snow layer, or more precisely the lack of accord between the water precipitated and that which later appears in the snow layer, was not expected. Some further explanation will perhaps make our meaning clear,

TABLE 15.—*Average depth and density of snow cover and atmospheric conditions during its life, at Bumping Lake, Wash.* (*U. S. Reclamation Service*)

Week ending—	Snow layer.		Precipitation during week.			Temperature.			Water available, total possible.	Gain or loss.	Week No.
	Average depth.	Density.	Snow.	Water equivalent.	Total, rain and snow.	Mean maximum.	Mean minimum.	½ [7+8].			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1914.	*Inches.*		*Inches.*	*Inches.*	*Inches.*	°*F.*	°*F.*	°*F.*	*Inches.*	*Inches.*	
Nov. 16	17.5	0.151	27.0	2.52	2.85	41.1	27.0	34.0	5.16	....	1
23	10.1	0.212	T.	0.0	0.38	38.7	23.7	31.2	2.52	−2.64	2
30	8.0	0.221	1.0	0.21	0.21	42.0	27.0	34.5	1.98	−0.54	3
Dec. 7	13.0	0.178	9.5	0.37	0.37	32.9	22.9	27.9	2.68	+0.70	4
14	11.7	0.196	3.0	0.19	0.19	25.7	9.0	17.3	2.38	−0.30	5
21	11.0	0.216	T.	T.	T.	26.7	−0.5	13.1	2.38	0.00	6
28	21.0	0.172	16.0	1.12	1.12	36.7	18.7	29.7	4.73	+2.35	7
1915.											
Jan. 4	21.4	0.206	5.5	[a] 0.73	0.73	35.4	22.6	29.0	5.13	+0.40	8
11	31.9	0.174	20.5	1.56	1.56	34.1	23.6	28.8	7.11	+1.98	9
18	37.8	0.202	18.0	1.57	1.57	35.4	14.0	24.7	9.20	+2.09	10
25	33.0	0.226	0.0	0.0	0.0	29.6	−1.6	14.0	7.46	−1.74	11
Feb. 1	31.4	0.240	12.0	0.84	0.84	36.9	15.1	26.0	8.38	+0.92	12
8	45.2	0.225	17.5	1.72	1.72	35.9	22.0	28.9	12.09	+3.71	13
15	41.4	0.246	1.0	0.09	0.09	40.0	11.1	25.5	10.27	−1.82	14
22	39.0	0.273	8.0	0.87	0.87	38.1	24.9	31.5	11.51	+1.24	15
Mar. 1	36.5	0.302	3.5	0.61	0.61	41.7	25.7	33.7	11.63	+0.12	16
8	33.4	0.329	T.	[a] 0.36	0.36	44.6	24.3	34.4	11.34	−0.29	17
15	28.8	0.350	T.	T.	1.77	44.4	27.4	35.9	11.85	+0.51	18
22	22.7	0.354	T.	T.	0.14	56.6	24.3	40.4	8.17	−3.68	19
29	17.2	0.306	0.0	0.0	0.07	48.3	28.9	38.6	6.36	−1.81	20
Apr. 5	9.8	0.329	0.0	0.0	2.77	49.3	31.4	40.3	5.99	−0.37	21
1916.											
May 15	43.4	0.396	9.0	[a] 1.28	1.28	50.7	27.3	39.0	18.46	....	....
29	17.7	0.406	0.0	....	0.46	51.1	32.6	41.8	7.64	−10.82	....

[a] Partly rain.

On the whole, the season of 1915–16 appears to have been one of deep snows with an uncommonly thick covering of snow on the ground most of the time, but not otherwise remarkable. Lake Tahoe reached its maximum summer level July 14, which is about 13 days later than the 7-year mean date. Since 1910 the maximum summer levels have occurred 3 times in June and 4 times in July. It seems that when the seasonal snowfall is above the average the lake is more likely to crest in July than in June.

The first entry in the table, viz, the record for the week ending November 16, 1914, shows that the depth of the snow layer was 17.5 inches with a density of 0.151. Just before the beginning of the snow there had been a rain of 0.33 inch and only a few days previous, there had been heavy rains so that while the ground was bare it was doubtless well saturated and unfrozen, a condition not favorable to the immediate absorption of any snow that might melt during the daylight hours. The total depth of the snowfall during the week, was 27.0 inches and it had lain on the ground about 48 hours. In that time there was a diminution in depth of 9.5 inches. The water equivalent of this snow, assuming that its density was the same as when it fell, must have been about 0.88 inch, therefore if no evaporation had taken place the density of the remaining snow should have increased by at least that amount. In the beginning, the density was 0.093. On November 16, it was 0.151, an increase of 0.058 which multiplied by the total depth, 17.5 inches, gives 1.01 inches as the total increase, or a net increase of 0.13 inch. These computations seem to indicate a melting of the top layers of the snow and the retention of the melted snow in the snow layer.

Continuing a similar comparison for the succeeding week, it is noticed that the depth of the snow layer has diminished from 17.5 to 10.1 inches; that there was no snow during the week but that a rain of 0.38 inch fell. The increase in density was from 0.151 to 0.212 or about 6 per cent and this would be equivalent to 0.61 water. The loss of water content during the week on account of diminution of depth, was however 2.64 inches, hence it is evident that the increase in density of the remaining snow layer only partly accounts for the loss of water here noted. During the third week there was a further loss in the water content of the snow although a small amount of fresh snow was added to the old snow. During the fourth week of the record there was a fall of 9.5 inches of fresh snow of rather low density. The depth of the old layer was increased by 2 inches, the density however, suffers a diminution and the water available shows a small increase. A fall of 3 inches of snow and prevailing low temperatures evidently checked the loss of water during the 5th and 6th weeks. During the next 4 weeks, viz, December 28 to January 18 inclusive, there was a fall of 60 inches of snow which resulted in an increase in the snow cover from 11 to 37.8 inches; there was also a slight increase in density and the available water increased from 2.38 to 9.20 inches or 6.82 inches, an amount that is greater by 1.84 inches than the increment of water precipitated as snow during the same time. A small part of this increase may be ascribed to the rain which fell on January 4, but the greater part of it remains unexplained.

The eleventh week was one of low temperature, no precipitation, and one altogether favorable to the conservation of the snow cover, yet it suffered a diminution of 4.8 inches in thickness and a loss in total water content of 1.74 inches. The increase in density amounted to about 2 per cent, not nearly enough to offset the loss due to the shrinking of the snow layer. Then followed two weeks of fairly heavy snowfall, resulting in the greatest depth of the winter, viz, 45.2 inches, with a total water content of 12.09 inches. From this point onward the depth diminished and the density increased rather steadily, the greatest density of the season being reached during the week that ended March 29, when, with a thickness of 17.2 inches, the density was 0.366. With a further diminution in depth to 9.8 inches the density fell to 0.329. *It seems probable that some water escapes to and is absorbed by the ground when the thickness of the snow layer is reduced to, say, less than 10 inches.* The diminution in density when an increase should have occurred, here observed has also been noted in the records for other stations, but it is evidently not a general phenomenon.

The two entries for 1916 are the only ones available for that year. They also show that the increase in density with age of the snow cover does not approach in any way the loss of possible water due to shrinking of the snow cover; thus the density of the snow cover increased but 1 per cent in the two weeks separating the measurements, whereas the depth diminished 25.7 inches.

A suggestion as to what becomes of the water represented by the shrinkage of the snow cover is found in a paper by Mr. Robert E. Horton (**10**), wherein it is shown that the percentage of precipitation appearing later as run-off in streams, varies very greatly during the winter and late spring months. In the case of West Canada Creek, of New York, during the winter of 1903–4, the run-off varied from 12.35 per cent in December, 1903, to 329.6 per cent in April, 1904.

Just how much water passes into the atmosphere by evaporation from a snow cover for the dry region west of the Rocky Mountains is not yet certain.

EVAPORATION OF SNOW.

European observations on the subject of the evaporation of snow generally seem to indicate that the amount of evaporation from a snow layer is small. Observations by Westmann (**8, 9**) point to a daily maximum value of 2 to 3 mm. (=0.08 to 0.12 inch) under favorable conditions. He remarks on the experiments:

> We have attempted to measure the evaporation of a snow cover in the following manner: Some slices of snow 15.5 by 22 cm. square on the surface and about 4 cm. high were cut out and placed in basins of the same dimensions. The basins, with white enameled inside surfaces, were placed in the snow cover in such manner that the surface of the snow contained was in the same plane as the surface of the surrounding snow cover. It may be assumed that the evaporation and condensation were the same at the surface of the snow in the basins as at the surface of the surrounding snow cover. To measure the evaporation, the basins were weighed each day at noon during the month of February and the larger part of March. Afterwards the measurements were generally more frequent, the samples of snow having to be renewed because of the ease with which they liquified, because of the warm weather and strong insolation. Often it was impossible to avoid melting. The evaporation measured was then the sum of the evaporation of the snow which remained and of the water from the melted snow. The measurements of evaporation in March and April, being in part affected by this error, do not represent, it is true, the evaporation of snow, but are the higher limits of this quantity, and thus have a certain value, since these limits are very low.

SUMMARY.

It seems well established that the density of fresh snow is least in midwinter and greatest in late spring and that, in general, the density increases with the temperature, but the tendency for precipitation to occur in the form of rain or sleet with temperatures above freezing adds to the uncertainty of density measurements when the air temperature is above freezing. It is believed that the error in density measurements with surface temperatures above 32°F. is greater and more frequent than is generally supposed.

The density of a snow cover, other circumstances as to weather being equal, is fairly uniform, as shown by the intensive snow surveys made in the West within the last few years. It seems well established, however, that, due to basic climatic differences, higher densities are to be expected in the Northeastern States than in the semiarid States of the West and Southwest.

There is urgent need of accurate determinations of the loss of snow by evaporation in the Far West of the United States, and also of discharge measurements in one or more basins in order to gage the run-off from melting snow and the contemporaneous precipitation. There is also need of a record of the inclusive dates between which the soil is frozen, and particularly as to whether or not the soil is frozen at the time the first enduring snow cover of the season covers the soil.

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A MODERN CHINESE METEOROLOGICAL MONTHLY.

In the MONTHLY WEATHER REVIEW for May, 1916, Mr. Co-Ching Chu[1] referred to a monthly magazine for astronomy, seismology, and meteorology, published in China. Very recently he kindly sent the editor a sample copy, viz, the issue for December, 1916, which it seems worth while to notice briefly here.

This new journal, whose first number appeared in July, 1915, bears the title "Journal of Meteorology and Astronomy" and is published at Peking by the Central Observatory of the Department of Education. Its front cover, which is the usual left-hand cover page of European journals, measures 25½ by 18 centimeters and is wholly in Chinese character ornamented with an equatorial orthographic projection of the Atlantic-Afric hemisphere having the meridian of Greenwich as the central meridian. The choice of hemispheres was, perhaps, influenced by the astronomical bent of the journal. Following the 14 pages of advertising in colored inks we find in the December, 1916, issue of volume II, 42 pages of matter on meteorology and astronomy followed by 100 pages (independently paged) of astronomical tables.

All the pages are numbered from left to right and, consistently, the text matter is arranged in lines reading from left to right instead of in vertical columns reading downward from right to left. The first 20 pages of the text are devoted to brief papers each independently paged, on astronomical and meteorological subjects, the issue before us containing an illustrated paper on the observation and measurement of cloud altitudes. All the illustrations here are from French sources only, which reminds us that the chief meteorological editor of the journal, Mr. Pin-Jen Chang, received his European education in France.

Pages 21 to 42, inclusive, begin with graphs of pressure, temperature, relative humidity, and winds at the Central Observatory, Peking, for the month in hand, in this case November, 1916. These are followed by daily values at Peking for the following elements:

Pressure: Mean, maximum, minimum, range (mm).
Temperature: Mean, maximum, minimum, range, for air (°C).
Precipitation (mm).
Clouds: Amount (per cent).
Winds: Direction, force (1–8).
Humidity: Relative; vapor pressure (mm.).
Ground temperatures at depths of 30 cm., 60 cm., 100 cm.; etc. (°C.).
Ground water temperature (°C.).
General notes on the weather and sky (international meteorological symbols).

The next 16 pages contain shorter tables giving daily morning and afternoon observations of: Pressure; temperature; relative humidity; wind, direction and force; state of the sky or weather at the following stations:

Name.	Longitude (E.).		Latitude (N.).		Name.	Longitude (E.).		Latitude (N.).	
	°	′	°	′		°	′	°	′
Amoy	118	06	24	28	Changsha	112	46	28	13
Swatow	116	40	23	21	Hankow	114	20	30	32
Ningpo	121	42	29	57	Wenchow	120	37	28	00
Chingkung	119	26	32	10	Pehai	109	04	21	28
Kiukiang	116	06	29	42	Ichang	111	21	30	40
Newchwang	122	36	40	58	Langpo	127	30	51	00
Chefoo	121.	25	37	32	Wuchow	110	26	23	32
Shami	112	55	23	10	Chungching	106	35	29	29

[1] "The Chinese Weather Bureau," MONTHLY WEATHER REVIEW, Washington, May, 1916, 44: 289.